APPENDIX F

OVERVIEW OF VISITOR CARRYING CAPACITY FRAMEWORK

Appendix F: Framework for Setting a Winter Visitor Carrying Capacity

The structuring of the alternatives in the Supplemental Environmental Impact Statement (SEIS) provides objectives, standards, and guidelines in many of these areas of consideration. The decision, in selecting an alternative, will provide a mix of recreation opportunity prescriptions (zones) that are located generally on a map. Each prescription or zone is defined by the desired resource condition or character, the desired visitor experience, and amount of development that is compatible with them. Further, each zone has a set of resource and visitor experience indicators that would guide management through monitoring and evaluation. General standards are set in a number of areas. Some alternatives allude to activities that would improve the parks' interpretive services and availability of information for visitors. Some alternatives generally prescribe changes in winter use supporting facilities. Some alternatives close areas to use because of sensitive resources. Once the final decision is made, there will be a framework with which to begin the process of recreation capacity determination.

LITERATURE REVIEW OF CARRYING CAPACITY MODELS

Visitor capacity as an issue in National Parks has been under recent consideration. Dr. Glenn Haas of Colorado State University published a paper in Social Science Research Review (Volume 2, No. 1, Spring 2001) entitled *Visitor Capacity in the National Park System*. The cover letter for this document indicates that the paper is intended to assist in understanding the issue, and it is not intended as a specific policy guide or management recommendation. The value of the paper is in assessing the "state of the art" of, in this case, visitor capacity analysis. The paper does not lay out a process that is recommended for use in determining capacity. The planning context and conclusions of the paper are presented below. Following this, additional discussion of the carrying capacity issue, through a review of literature, is presented. The discussion is consistent with the content of Haas' review.

"Recreation carrying capacity is defined as a prescribed number and type of people that an area will accommodate given the desired natural/cultural resources conditions, visitor experiences, and management program. A capacity serves as a trigger or signal that alerts management that other actions may be necessary to sustain the area's resources, visitor experiences, and management effectiveness. Capacities are unfortunately confused with visitor

limits or closures, and it is important to understand that a capacity does not itself prescribe any specific management response. It is a useful management tool to assure the protection and enjoyment of park resource and values for present and future generations (Haas 2001)." Recreation capacity decisions are made as part of planning efforts undertaken in accordance with NEPA processes. NPS management policy (Section 8.2.1) states that such decisions are appropriate in general management plans. However, if management plans are not current or if detailed decisions are needed then the VERP process is to be used. Finally, if there is insufficient time in which to perform VERP, then capacity decisions are to be made on the best available information accompanied by appropriate NEPA analysis.

"National park managers are required by law to establish capacities for all parks. These decisions are made as part of a planning process and incorporate the best available science. Social science research on recreation carrying capacity is a young field of science and small in terms of the number of scientists and funding. Complexity more than resolution is a predominant finding, with specific "truths" applicable across park visitors and sittings remaining illusive [sic] Yet, progress has been made and this synthesis of social research identifies nine general findings that may contribute to improved planning and sound professional judgement:

- capacity defies scientific determinism;
- public values are diverse and go beyond recreation;
- recreation experiences are muti-dimensional
- recreationists can be grouped by experiences;
- social interaction is important for some experiences;
- perceived crowding is a dominant focus;
- recreation satisfaction can be measured;
- management can change recreation capacity; and
- recreation can change resource conditions.

Discussion of Carrying Capacity Analysis

Central to any land management objective is the underlying element of change. Change is inevitable in any natural system. It has been well documented that even very low levels of use by animals or humans can have a marked impact on the ecological regime (Frissell and Duncan 1965). In defining land management objectives, the fundamental question to be answered is not whether to allow or eliminate change but how much change to allow.

Carrying capacity models assist natural resource managers to determine when a given land area is receiving too much use. These models were originally developed by range and wildlife

managers to define the number of animals that can be maintained within a given amount of habitat (Burch 1981). Traditionally, carrying capacities were defined by three types or levels of use, minimum, maximum, and optimal. Each level of use is based on different assumptions about the ecosystem and the managed population.

In an attempt to determine appropriate human use levels, recreation managers began to use the carrying capacity model to determine how much human use or recreation a landscape can maintain. Unlike the simpler models used by range and wildlife biologists, recreational carrying capacities were forced to undertake the enormous task of not only determining physical carrying capacities, but human experiential capacities as well. Lime and Stankey (1986) have defined recreational carrying capacity as "the character of use that can be supported over a specified time by an area developed at a certain level without causing excessive damage to either the physical environment or the experience of the visitor." Typically, the carrying capacity framework consists of two basic components, a descriptive component and an evaluative component. The descriptive component uses objective data that describes how people behave in and affect a given recreation system. Use levels, types of use, frequency of use, and season of use are all examples of the descriptive component. The evaluative component is a value judgment, or more clearly stated, a management objective that outlines specifically how much impact (ecological or social) is too much for any given area.

Carrying capacities may be defined by four basic parameters: facilities, physical, ecological, and social. These constraints provide an opportunity for recreation managers to make decision for different management objectives or for different levels and types of impacts.

Physical and facility carrying capacities are determined simply by the amount of space that is available in a given recreation setting. The ecological parameters of carrying capacity determination are concerned with impacts to the plants, animals, soil, water, and air. Social impacts focus on the level of use beyond which the recreational experience is negatively impacted. The two main parameters of recreational carrying capacities are ecological and social.

For obvious reasons social impacts to recreation systems are the most difficult of the four parameters to determine. While management objectives may clearly state the specific management objectives for maintaining water quality, soil, and vegetation and may clearly define the number and type of facilities that may occupy a given ground area, the determination of the quality of user experience is elusive. In order to determine social

impacts, human value judgments are necessary. The quality of experience may be determined by such elements as type of user, amount of use, location of encounter, number of other users encountered, and the size of group encountered. In addition, recreationists generally choose the type of setting they prefer. Users may also be "displaced", or crowded out, by an increase in use level.[1]

It is often the judgment of land managers that an increase in human use is perceived by recreational users as a negative impact. This is not always an accurate assumption. In a study of Wisconsin deer hunters, two distinctly different groups of hunters were surveyed. Group one indicated that a low level of contact with other hunters was preferable, with zero encounters optimal. Group two indicated that encounters with other groups will increase their chances of hunting success (by moving deer around) and so be perceived as favorable (Stankey 1973).

The quality of the user's experience may be more directly related to the type and behavior of other users encountered than by the level of use encountered. Recreationists are typically bothered less by encounters with similar types of users. For example backpackers have been found to be less bothered by multiple encounters with other backpackers than they are with multiple encounters with horseback riders (Stankey 1980).

Because of the many social variables in any recreational social carrying capacity model the framework is most useful as an ideological tool for land managers. Several problems exist in recreational carrying capacity models that make them difficult to use in real world situations.

For example, of real world importance to recreation managers is the disparity between demand and supply. With a dramatic increase in demand for a "motorized oversnow experience" and little increase in land area with the ability to provide "opportunities for free and unconfined motorized recreation" is not just difficult but, in some areas like national parks, impossible.

Inherent in any capacity model is the idea that there is a "magic number" that may be determined. This idea suggests that somehow the landscape has the ability to withstand use (Stankey 1980). The fact that there is often no linear relationship between quality of experience and level of use further complicates the matter. Stankey (1984) agrees stating "carrying capacity models are a management system directed towards maintenance and

[1] In the context of winter use, large issues surround the concept that increasing motorized use within the Greater Yellowstone Area has largely displaced skiing and other nonmotorized visitors who have a different set of preferences. The situation is difficult in that efforts or allocations to provide for

restoration of ecological and social conditions defined as acceptable and appropriate in area management objectives it is not a system directed toward manipulation of use levels per se." Because of the elusive nature of defining a level of use appropriate for a recreation experience, land managers often concentrate solely on the impacts of recreation use on the ecological system and entirely avoid the experiential nature of the use. Perhaps even more unfortunate are those managers, who rather than avoid the social aspect of recreation management, spend an enormous amount of time and money trying to pin down a finite capacity value. This approach as Graefe et al. (1986) pointed out that carrying capacities are "meaningless unless it is expressed conditionally in relation to objectives that specify capacity for what."

LIMITS OF ACCEPTABLE CHANGE MODEL

An alternative model that is appropriate for specifically identifying land management objectives is the Limits of Acceptable Change model (LAC) (Stankey et al. 1984). Unlike traditional carrying capacity models the LAC accepts that change will inevitably occur. LAC is a broad framework which uses problem identification and management solutions based on comparison of site conditions and selected standards and guidelines. The LAC model removes itself from the pursuit of the "magic number" or capacity value and focuses land management objectives on the identification of problems through the use of public input, ecological assessment, external influences, and administrative processes. Although there is some value judgment inherent in any decision making process the LAC model allows land managers to make decisions based on existing and desired future conditions (both ecological and social) of a specified land area. This model has been put into practice by the Forest Service (USFS) in dealing with problems of wilderness overuse.

VISITOR EXPERIENCE AND RESOURCE PROTECTION (VERP) FRAMEWORK

In 1992, the Park Service began developing the VERP framework to address visitor use management and carrying capacity issues in the units of the national park system. VERP is based on the LAC model and is one of the adaptations of it. A working definition of VERP is: "a planning and management framework that focuses on visitor use impacts on the visitor experiences and the park resources. These impacts are primarily attributable to visitor behavior, use levels, types of use, timing of use, and location of use. There are nine elements that are integral to the VERP framework:

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nonmotorized uses could at this point displace motorized users who feel that they have already lost too much available area to wilderness or wildlife "closures."

1. Assemble an interdisciplinary project team.
2. Develop a public involvement strategy.
3. Develop statements of park purpose, significance, and primary interpretive themes; identify planning constraints.
4. Analyze park resources and existing visitor use.
5. Describe a potential range of visitor experiences and resource conditions (potential prescriptive zones).
6. Allocate the zones to specific locations in the park (prescriptive management zoning).
7. Select indicators and specify standards for each zone; develop a monitoring plan.
8. Monitor resource and social indicators.
9. Take management action.

The Winter Use SEIS is structured to facilitate this process. When a final alternative is selected and implemented as a plan, steps one through seven will essentially have been accomplished. Indicators and standards will need to be validated through monitoring for specific areas within the parks.